

Ocean Surface Topography Science Team Meeting, CalVal Splinter

"The effect of geocenter motion on Jason-2 and Jason-1 orbits and the mean sea level"

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We have investigated the impact of geocenter motion on Jason-2 orbits. This was accomplished by computing a series of Jason-1, Jason-2 GPS-based and SLR/DORIS-based orbits using ITRF2008 and the IGS repro1 framework based on the most recent GSFC standards. From these orbits, we extract the Jason-2 orbit frame translational parameters per cycle by the means of a Helmert transformation between a set of reference orbits and a set of test orbits. The fitted annual and seasonal terms of these time-series are compared to two different geocenter motion models. Subsequently, we included the geocenter motion corrections in the POD process as a degree-1 loading displacement correction to the tracking network. The analysis suggested that the GSFC's Jason-2 std0905 GPS-based orbits are closely tied to the center of mass (CM) of the Earth whereas the SLR/DORIS std0905 orbits are tied to the center of figure (CF) of the ITRF2005 (Melachroinos et al., 2012).

In this study we extend the investigation to the centering of the GPS constellation and the way those are tied in the Jason-1 and Jason-2 POD process. With a new set of standards, we quantify the GPS and SLR/DORIS-based orbit centering during the Jason-1 and Jason-2 inter-calibration period and how this impacts the orbit radial error over the globe, which is assimilated into mean sea level (MSL) error, from the omission of the full term of the geocenter motion correction.